

## RESPONSE TO OFFICE ACTION

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**IN THE CLAIMS**

1. (Currently Amended) A method for in-situ and real-time plasma chamber condition monitoring, comprising:

inserting a non-production wafer into a plasma chamber;

injecting a probing gas into a plasma chamber the plasma chamber, the probing gas comprising a source of free radicals;

striking the probing gas into a probing plasma;

measuring a density the emission intensities of the free radicals in the probing plasma; and

determining whether to continue a plasma process commence plasma processing of a production wafer on the basis of the measured density of the free radicals emission intensities.

2. (Currently Amended) The method of claim 1 wherein the probing gas plasma includes at least a free radical such as Br, Cl, O or F, preferably BR, and an inert gas molecule.

3. (Currently Amended) The method of claim 2 wherein the inert gas molecule accounts for 5%-10% of the probing gas plasma.

4. (Currently Amended) The method of claim 2 wherein the density of [[a]] the free radicals radical in the probing plasma is defined as the a ratio of emission intensities between of the free radicals radical and the inert gas molecule .

5. (Currently Amended) The method of claim 4 wherein the density of the free radicals radical density is compared with a first predefined level.

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6. (Currently Amended) The method of claim 5 further comprising:  
taking the plasma chamber out of production wherein if in response to a  
determination that the density of the free radicals radical density is below the first  
predefined level, ~~the plasma chamber is taken off production.~~
7. (Currently Amended) The method of claim 4 wherein the density of the free  
radicals radical density is compared with a second predefined level.
8. (Currently Amended) The method of claim 7 further comprising:  
processing the production wafer in response to a determination that wherein if  
the density of the free radicals radical density is above the second predefined level, ~~the~~  
~~plasma chamber is brought back to production.~~
9. (Original) The method of claim 1 wherein the free radicals in the probing plasma  
include at least one of Br, Cl, O or F.
10. (Original) The method of claim 1 wherein the probing plasma also includes at  
least one of Ar or Xe.
11. (Currently Amended) A method for controlling a seasoning process detecting  
over-seasoning in a plasma chamber comprising:  
injecting a seasoning gas into a plasma chamber, the seasoning gas comprising  
a source of free radicals;  
striking the seasoning gas into a seasoning plasma;  
seasoning the processing chamber;  
measuring a density ~~the emission intensities of the~~ free radicals in the seasoning  
plasma; and  
determining [[if]] when the plasma chamber is seasoned ~~over-seasoned or not~~  
according to the measured density of the free radicals ~~emission intensities.~~

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12. (Currently Amended) The method of claim 11 wherein the seasoning ~~plasma gas~~ includes an inert gas and at least one of a free radical such as Br, Cl, O or F, preferably BR, and an inert gas molecule.

13. (Currently Amended) The method of claim 12 wherein the inert gas molecule accounts for 5%-10% of the seasoning gas plasma.

14. (Currently Amended) The method of claim 12 wherein the density of ~~[[a]] the free radicals radical in the seasoning plasma~~ is defined as the a ratio of emission intensities between of the free radicals radical and the inert gas molecule.

15. (Currently Amended) The method of claim 14 wherein the density of the free radicals radical density is compared with a predefined level.

16. (Currently Amended) The method of claim 15 further comprising:  
extinguishing the seasoning plasma wherein if when the density of the free radicals radical density is above the predefined level, ~~the chamber seasoning is deemed to be complete.~~

17. (Original) The method of claim 11 wherein the free radicals in the probing plasma include at least one of Br, Cl, O or F.

18. (Currently Amended) The method of ~~claim 17~~ claim 12 wherein the inert gas comprises probing plasma also includes at least one of Ar or Xe.

19. (Currently Amended) A method for detecting process drift in a plasma chamber comprising:

Injecting a process gas into a plasma chamber, the process gas comprising a source of free radicals;

striking the process gas into a process plasma;

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measuring a density ~~the emission intensities of the~~ free radicals in the process plasma; and

determining ~~the an~~ extent of process drift according to the measured density of the free radicals ~~emission intensities~~.

20. (Currently Amended) The method of claim 19 wherein the process plasma includes ~~at least a free radical and an inert gas molecule~~.

21. (Currently Amended) The method of claim 20 wherein the inert gas ~~molecule~~ accounts for 5%-10% of the process gas ~~seasoning plasma~~.

22. (Currently Amended) The method of claim 20 wherein the density of ~~[[a]] the free radicals radical in the process plasma~~ is defined as the ratio of emission intensities ~~between of the free radicals radical and the inert gas molecule~~.

23. (Currently Amended) The method of ~~claim 2~~ claim 19 wherein the density of the free radicals ~~radical density~~ is compared with a predefined level.

24. (Currently Amended) The method of claim 23 further comprising:  
deeming the plasma chamber unsuitable for production wherein if when the density of the free radicals radical density is below the predefined level, the plasma chamber is deemed to be unsuitable for production wafer etching.

25. (Original) The method of claim 19, wherein the free radicals in the probing plasma include at least one of Br, Cl, O or F.

26. (Original) The method of claim 25 wherein the probing plasma also includes at least one of Ar or Xe.

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**27-30. (Cancelled)**

**31. (New) The method of claim 1, wherein the source further comprises at least one of Br<sub>2</sub>, Cl<sub>2</sub>, O<sub>2</sub>, and CF<sub>4</sub>.**

**32. (New) The method of claim 11, wherein the source further comprises at least one of Br<sub>2</sub>, Cl<sub>2</sub>, O<sub>2</sub>, and CF<sub>4</sub>.**

**33. (New) The method of claim 19, wherein the source further comprises at least one of Br<sub>2</sub>, Cl<sub>2</sub>, O<sub>2</sub>, and CF<sub>4</sub>.**

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